LDWSF
4.8.2
1-14-15

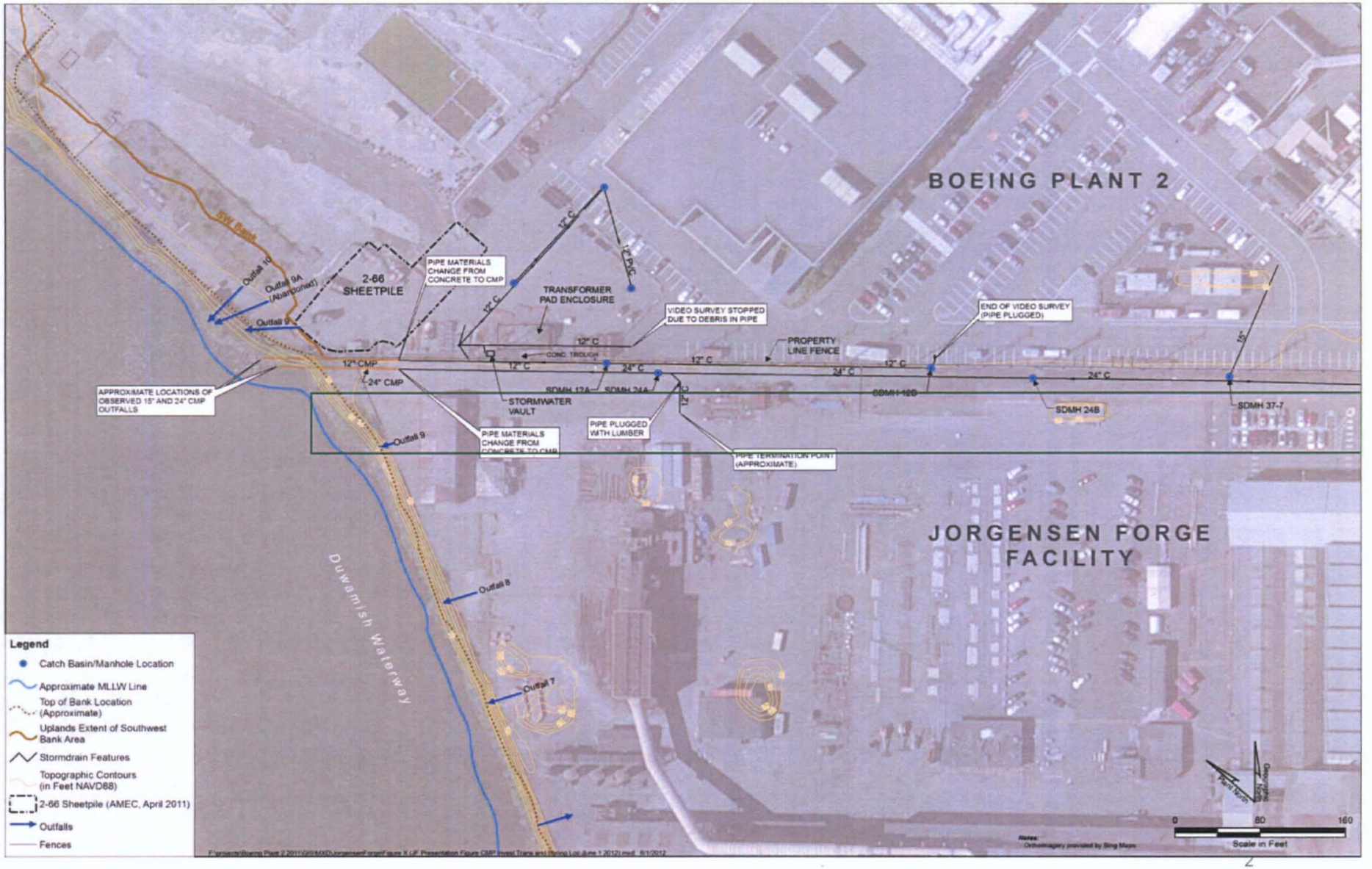
Jorgensen Forge Outfalls Site (JFOS)

USEPA with Boeing and Jorgensen Forge

January 14, 2015

PRESENTATION MATERIALS FOR DISCUSSION PURPOSES ONLY

JFOS Site Location



JFOS Order Status

- AOC Signed on 12/1/10
  - Field Work conducted Jan- Mar 2011
    - Clay pipes cleaned/sealed from East Marginal to Transition to Corrugated Metal Pipes (CMP)
    - Initial Geoprobe soil and groundwater Study around CMP
  - Completion Report approved by EPA July 2011
- First Modification to the AOC Signed on 3/23/12
  - Geoprobe Field Work conducted late March 2012
  - Completion Report approved by EPA August 2012
- Second Modification to the AOC Signed on 8/19/13
  - Angle Geoprobes Extended Further Under Shoreline Bank in October 2013
  - Sheetpile Cofferdam designed and installed in February 2014
  - EMJ dredges out PCB-impacted sediment and backfills in mid August 2014
  - Sheetpiles removed in late August 2014
  - Supplemental Completion Report submitted October 2014

Initial AOC Work

Goal: Address high levels of contamination in the Outfall pipes

- Seal upstream end of 24-inch clay pipe.
- Remove accumulated solids and jet clean interior of pipes, laterals, and manholes.
- Seal pipes at transition to CMP to prevent tidal waters from entering.
- Video pipes for all connections/laterals
- Sample solids within the 12-inch and 24-inch pipes, manholes, and laterals.
- Geoprobe borings advanced along three transects perpendicular to shoreline
- Results:
  - PCBs >> 50 ppm found at depth in CMP area
  - Further investigation necessary

First Modification Work

Goal: Define Extent of PCBs > 1 ppm beneath CMP sections

1. 13 Geoprobe borings advanced, intensive sampling to 42' BGS
2. Soil samples collected mainly for PCBs, some VOC, SVOC and metals analysis
3. Logged soils and fill occurrence; transition to native soils noted
4. Fill included sand (possibly hydraulic fill), rock fill, and poor quality fill; visible contamination and sheens were noted

Second Modification Work

Goal: Define Extent of PCBs > 1 ppm under bank and install/remove sheetpile

1. 4 angle borings advanced under shoreline
2. Cofferdam installed to contain underbank contamination
3. Sheetpile removed/stored for subsequent use

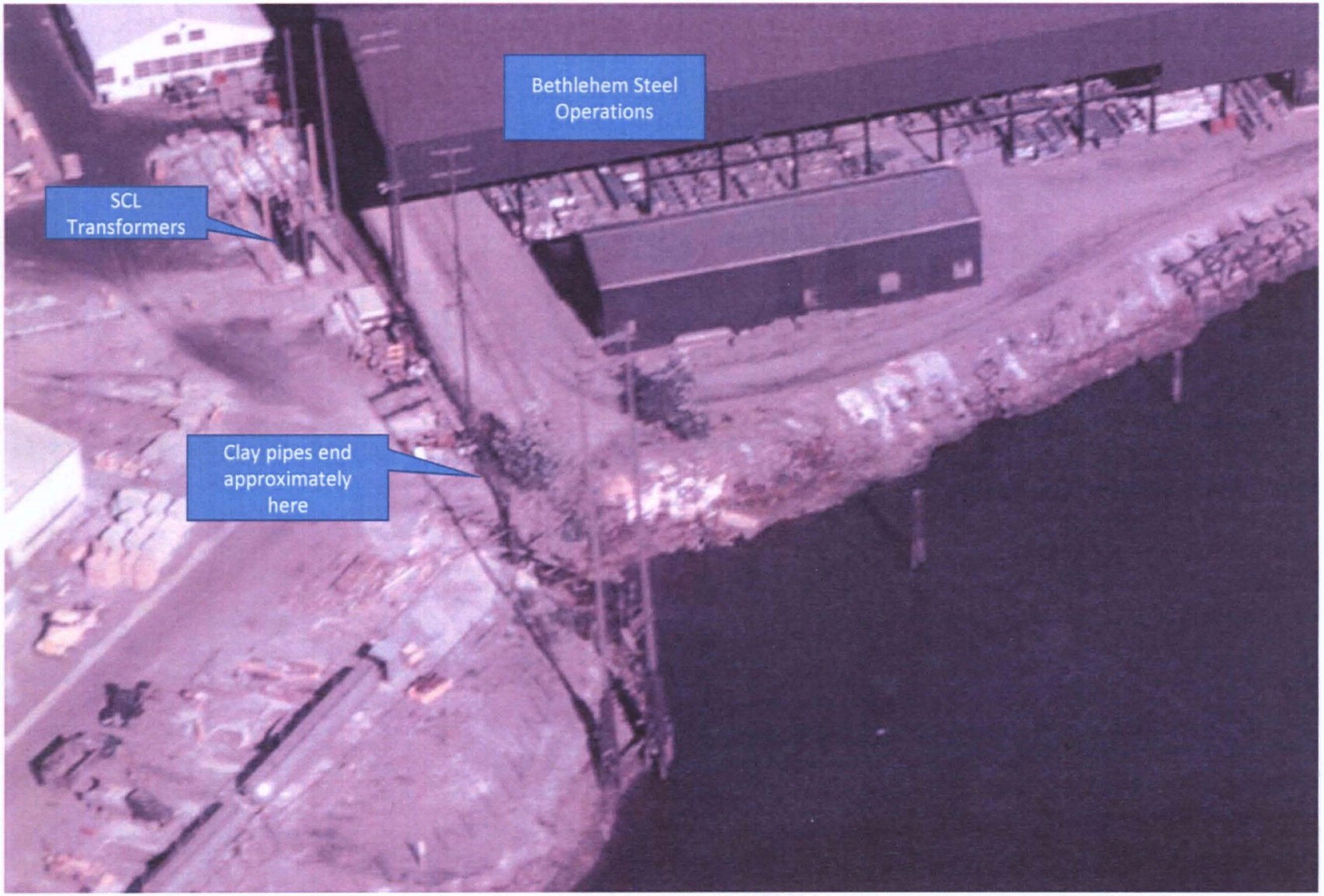
Conceptual Site Model

- Background and Outfall Area History
- Extent of Contamination
- Pathways of Exposure

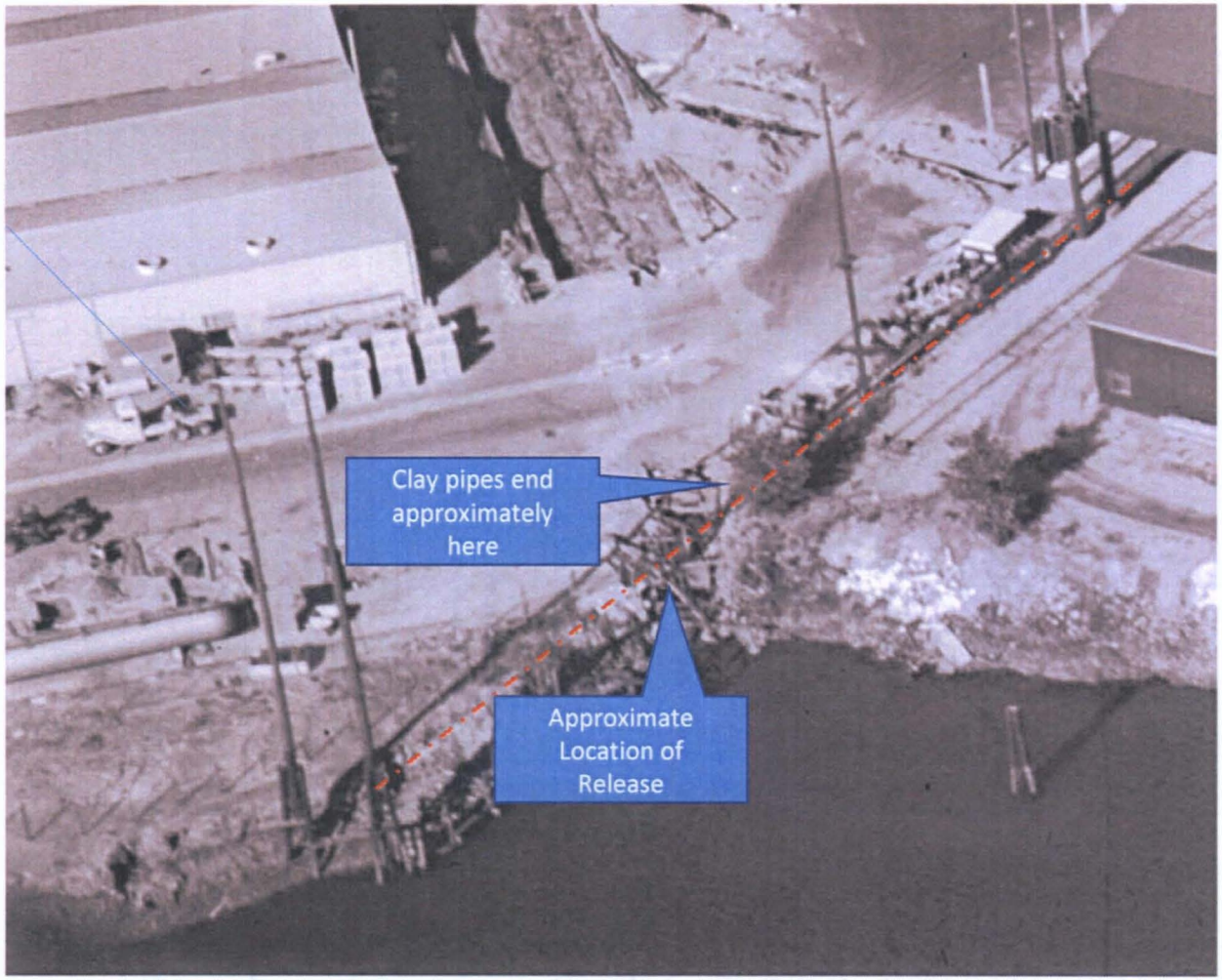
JFOS Shoreline with Plant 2 and Isaacson Steel – 1942

Plant 2 manufacturing of airplanes and Isaacson Steel manufacturing drive shafts for maritime vessels.

JFOS shoreline with Bethlehem Steel facility - 1953



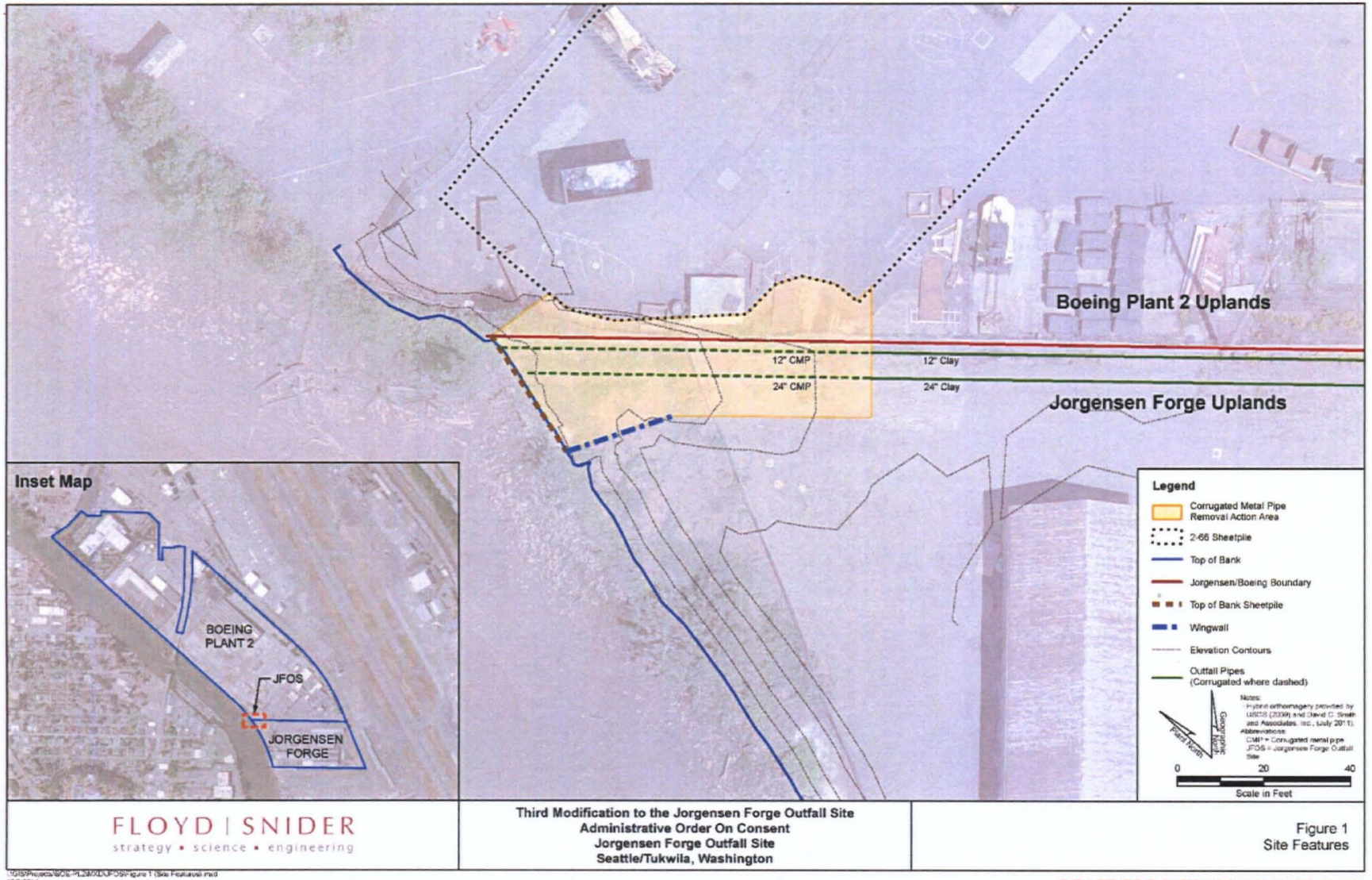
JFOS Shoreline - 1953



Nature & Extent of Contamination in CMP Segment Area

- Corrosion and holes in CMP sections indentified in 2005 video survey
- Significant (> 50 ppm) PCB contamination beneath pipes
  - Beginning at the end of the clay pipe and extending toward waterway
  - Distinct "hot spots" beneath the 12-inch and 24-inch CM pipes.
- PCBs > 1 ppm found as deep as 32 feet bgs
- All samples between 32 feet to 40 feet < 1ppm
- One of two deep samples from 40-42 feet is ~2 ppm, attributed to drag down

Third Modification Figure – Submitted Draft



FLOYD | SNIDER
strategy • science • engineering

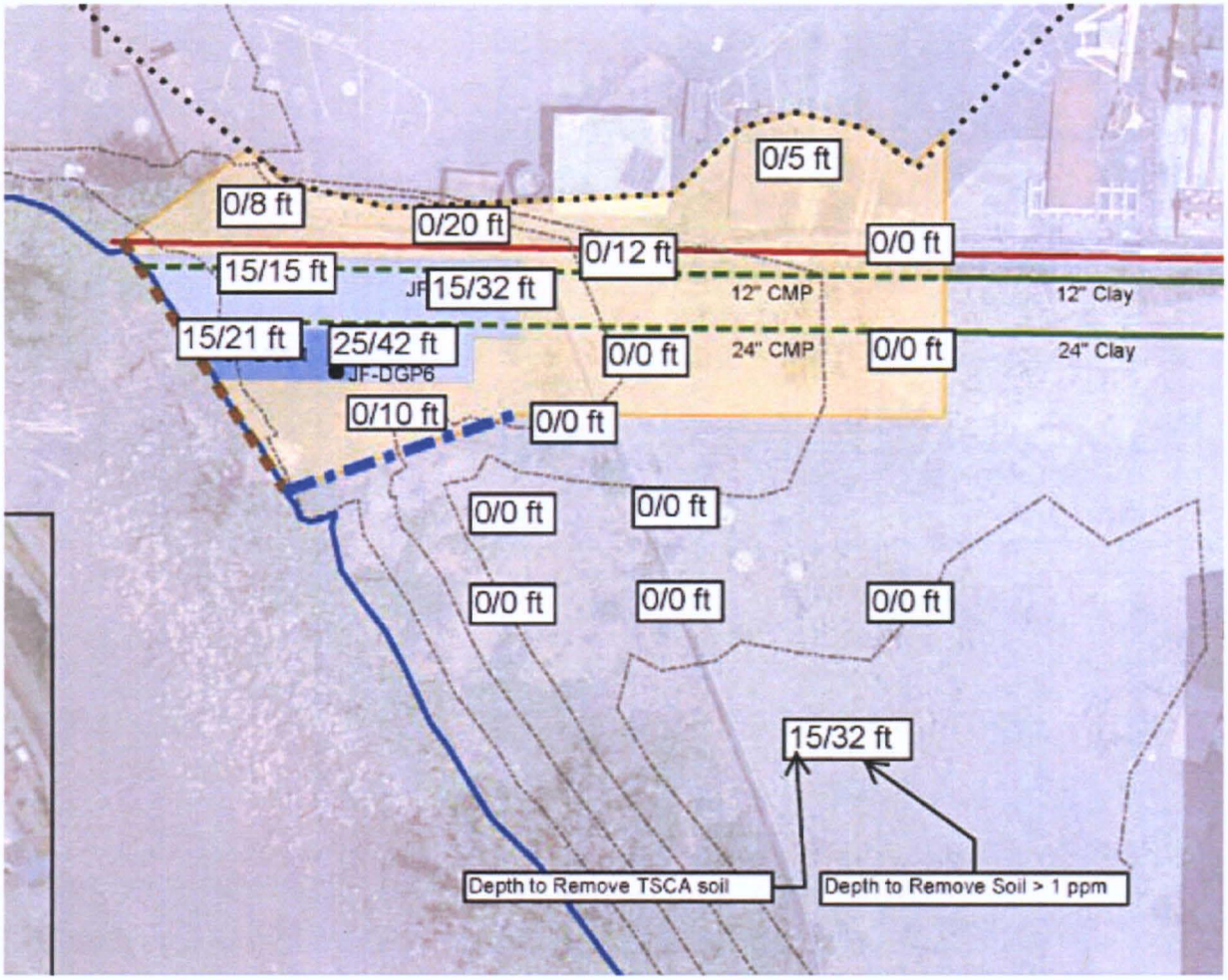
Third Modification to the Jorgensen Forge Outfall Site
Administrative Order On Consent
Jorgensen Forge Outfall Site
Seattle/Tukwila, Washington

Figure 1
Site Features

G:\SP\Projects\BOE-PL2M\DJF-OS\Figure 1 (Site Features).mxd
12/3/2014

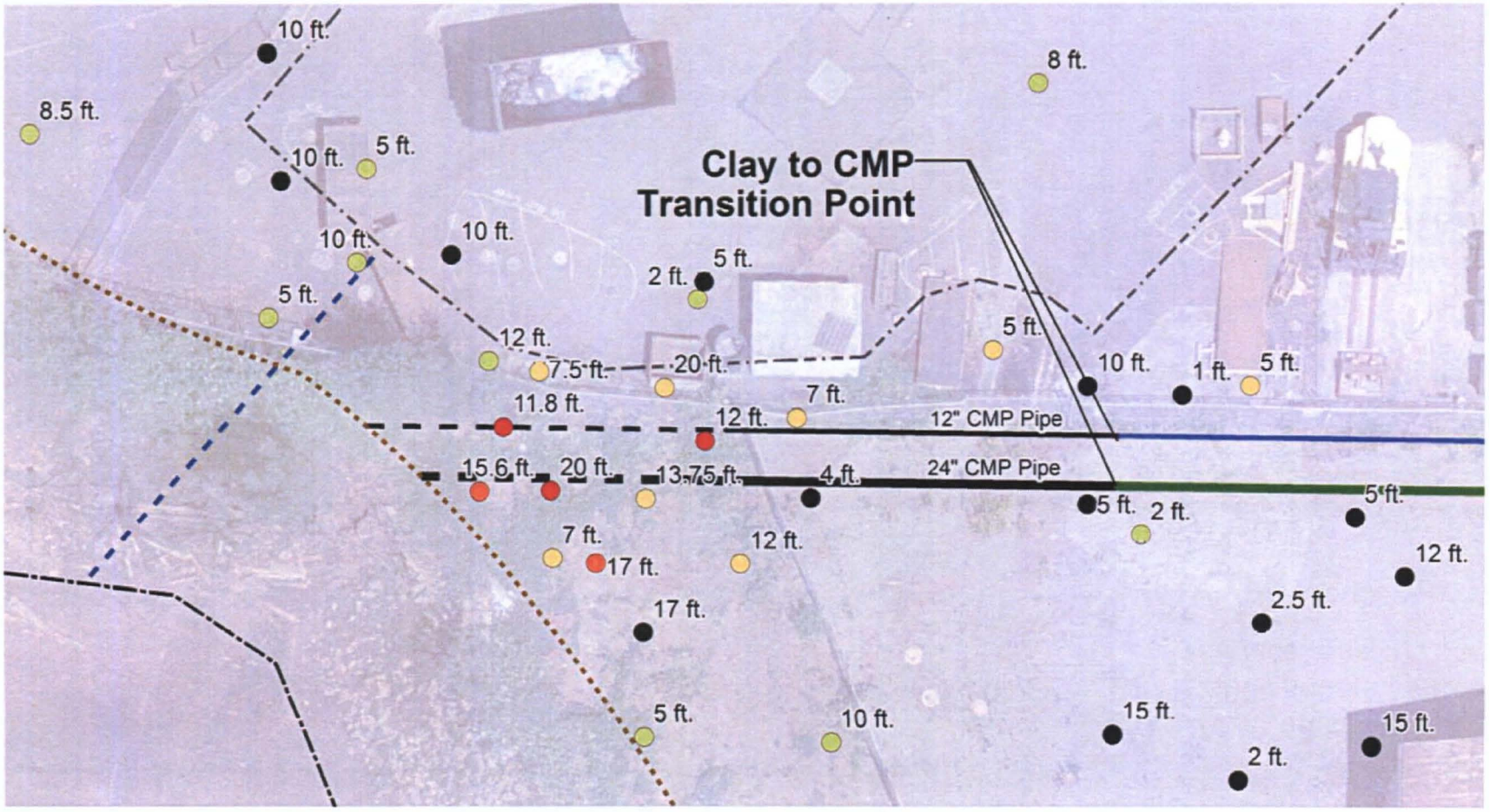
DRAFT FOR DISCUSSION PURPOSES

Depth and Areal Extent of PCBs Relative to 50 ppm

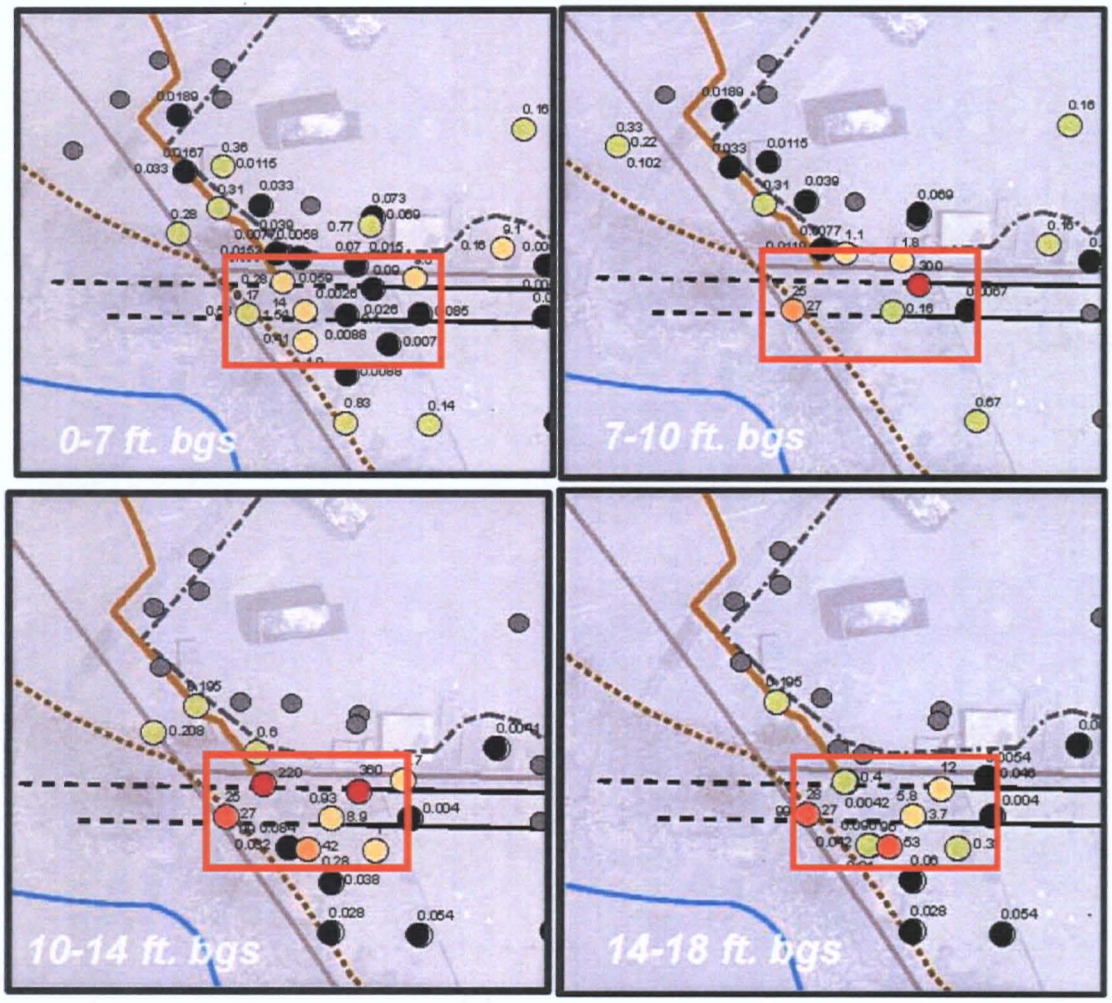


Data boxes: maximum depth of PCBs >50 ppm / depth to reach 1 ppm

Area Surrounding CMP has been Extensively Studied as Well



Results: Surface to 18 ft bgs (18 ft bgs = 0 MLLW)



An approximately 2,000 square foot surface area

Total PCBs in soil in mg/kg (ppm)

- Non-Detect
- Detected < 0.130 ppm
- 0.130 to <1 ppm
- 1 to <25 ppm
- 25 to <50 ppm
- 50 to <150 ppm
- > 150 ppm

Results: 18 to 34 ft bgs

An approximately 2,000 square foot cleanup box.

Total PCBs in soil in mg/kg (ppm)

- Non-Detect
- Detected < 0.130 ppm
- 0.130 to <1 ppm
- 1 to <25 ppm
- 25 to <50 ppm
- 50 to <150 ppm
- > 150 ppm

Human Health & Environment Risk Pathways

Assumptions:

- Risk to be managed is from soil deeper than 8 feet
  - Direct Contact Risk to Workers
  - Groundwater migration pathway
- Ecological Risk to Sediments and Waterway is addressed and not part of the Third Modification Scope

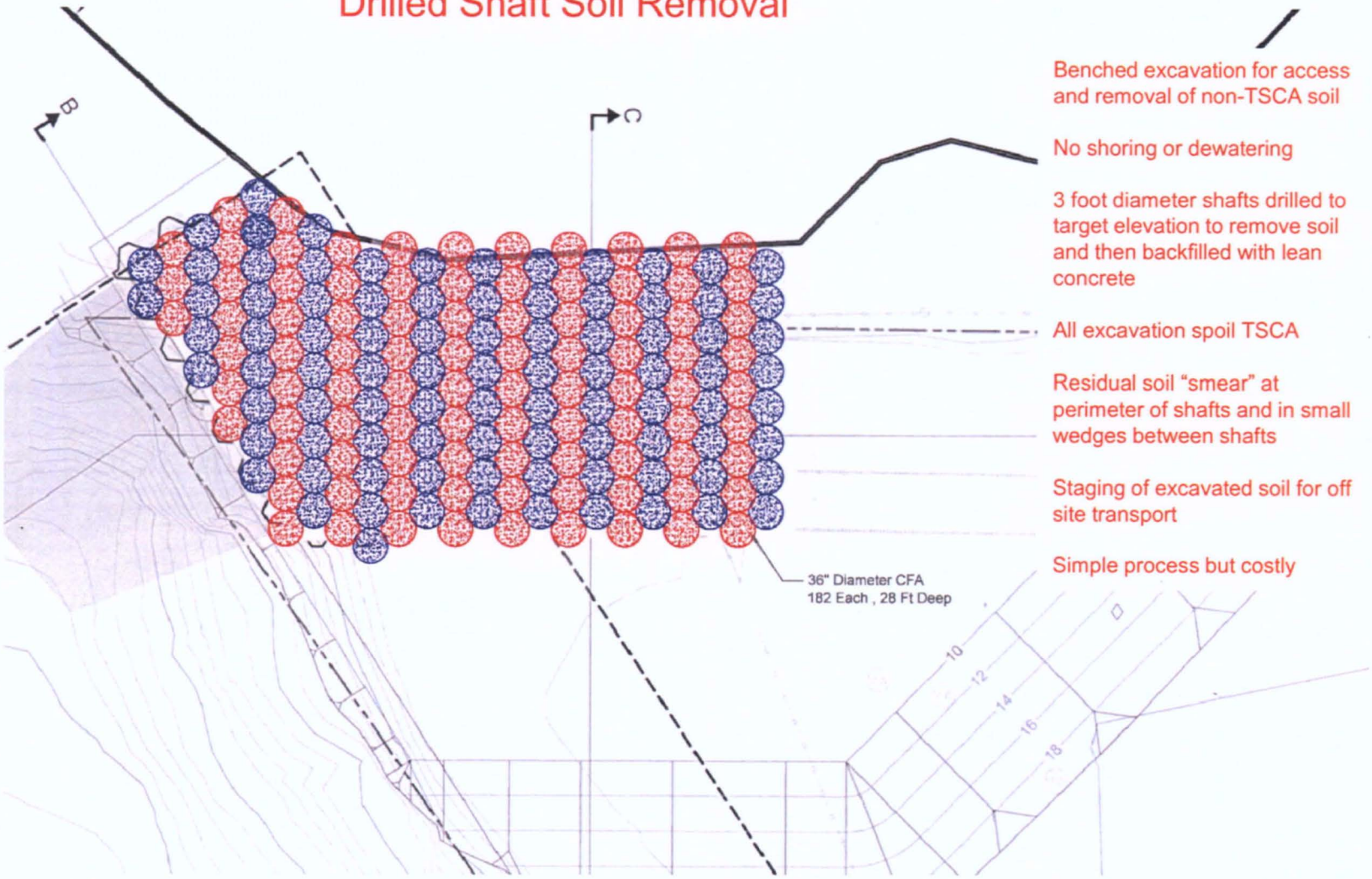
Objective and Assumption:

- Removal of PCBs >1 ppm (per TSCA rule and for MTCA Residential Cleanup Level) will address both pathways and, therefore, not require institutional controls

Remedial Options Considered - All achieve the goal

- Drilled Shafts - "Cookie Cutter" soil removal & replacement with lean concrete
- Slurry Trench – Soil removal & replacement with lean concrete
- Braced Sheet Pile Shoring & Excavation in the Dry
- **Unbraced Sheet Pile Shoring & Excavation in the Wet (Preferred)**

Drilled Shaft Soil Removal



Benched excavation for access and removal of non-TSCA soil

No shoring or dewatering

3 foot diameter shafts drilled to target elevation to remove soil and then backfilled with lean concrete

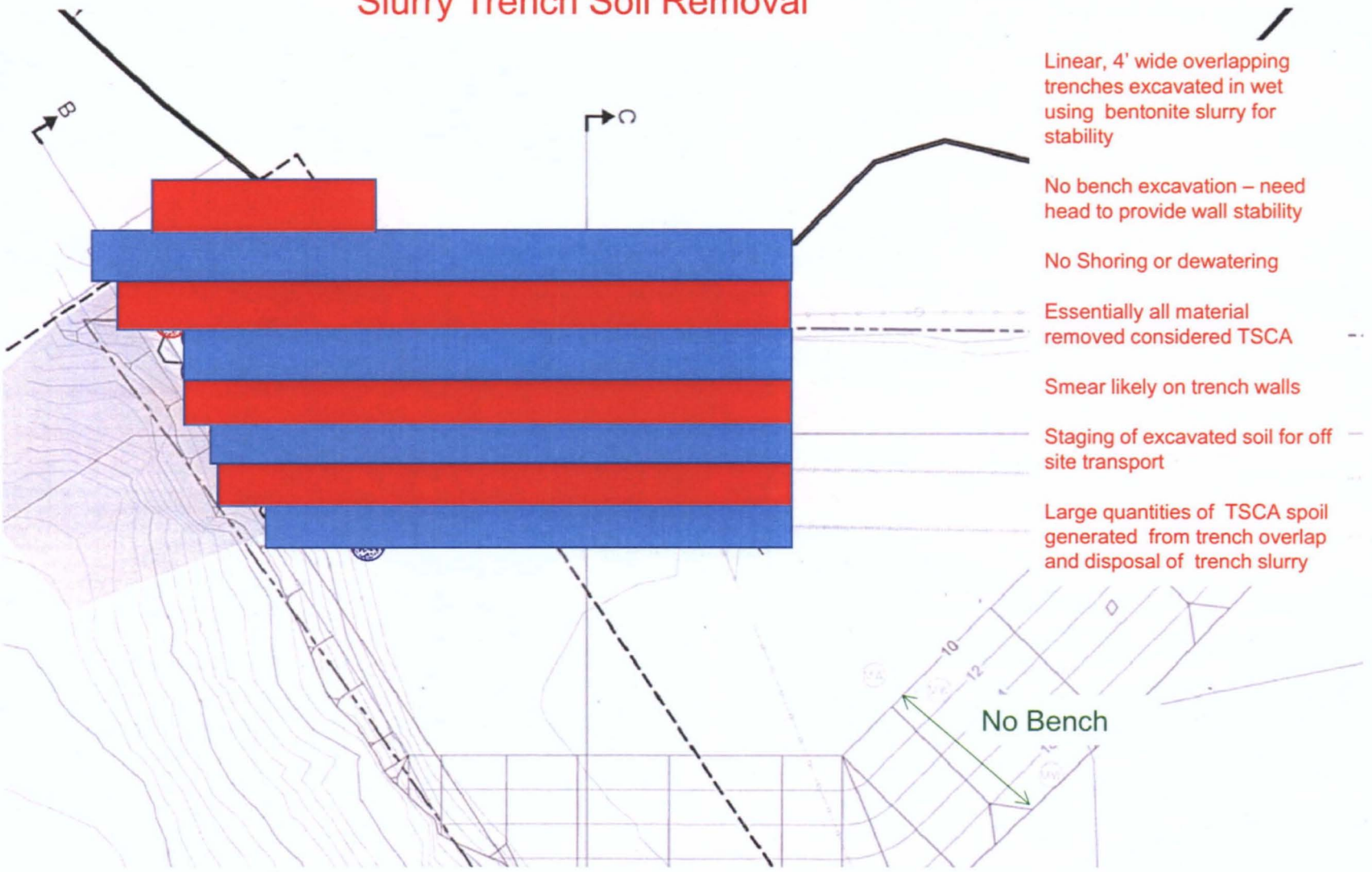
All excavation spoil TSCA

Residual soil "smear" at perimeter of shafts and in small wedges between shafts

Staging of excavated soil for off site transport

Simple process but costly

Slurry Trench Soil Removal



Linear, 4' wide overlapping trenches excavated in wet using bentonite slurry for stability

No bench excavation – need head to provide wall stability

No Shoring or dewatering

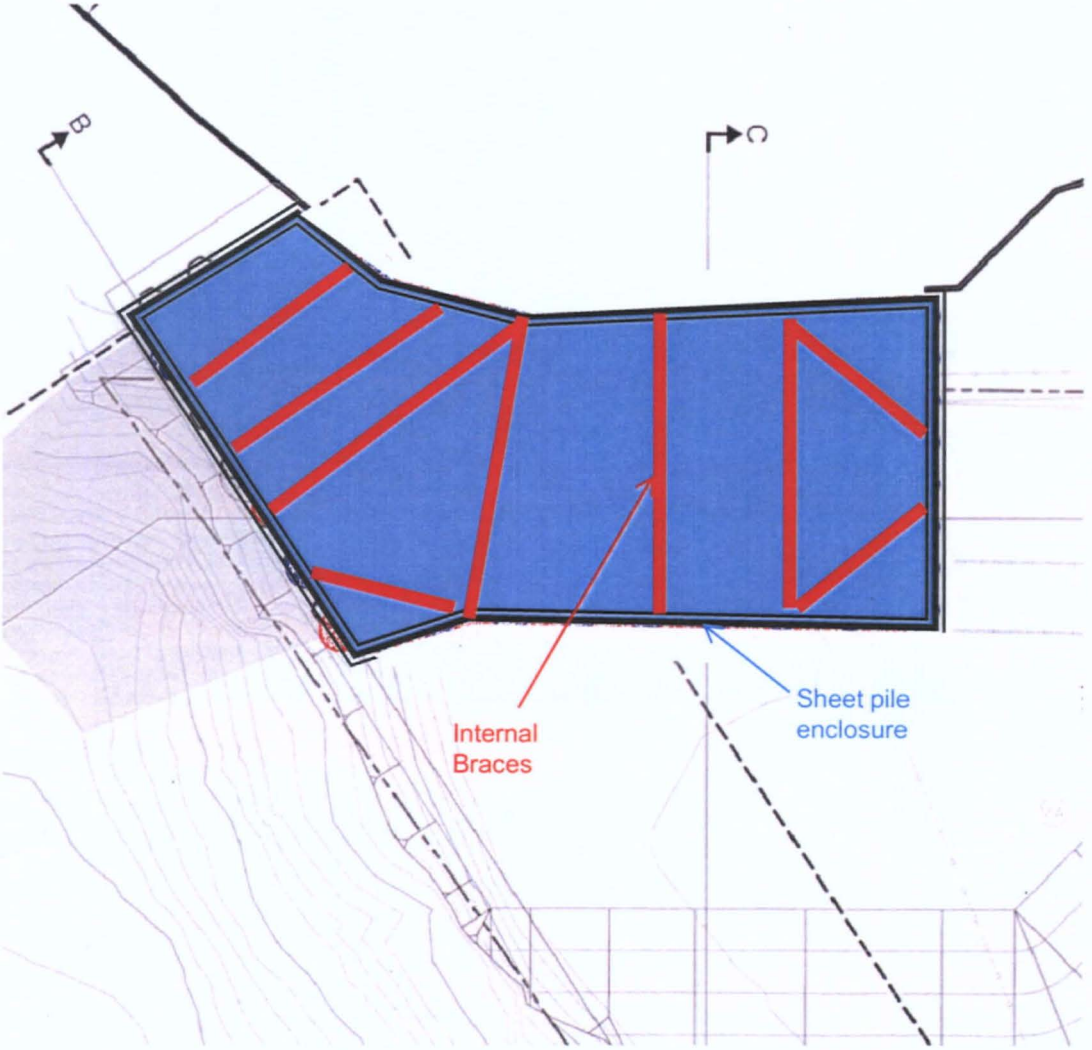
Essentially all material removed considered TSCA

Smear likely on trench walls

Staging of excavated soil for off site transport

Large quantities of TSCA spoil generated from trench overlap and disposal of trench slurry

Braced Sheet Pile Shoring & Excavation in the Dry



Bench cut non TSCA soil for access

Drive Sheets on perimeter to face of Boeing 2-66 wall

Install dewatering wells inside shoring

Excavate in 5 foot lifts and install internal bracing

Tedious less safe excavation in confined space with mini excavators to remove soil between braces

Confirmation sampling at base excavation

Backfill with Sand & Gravel and remove bracing

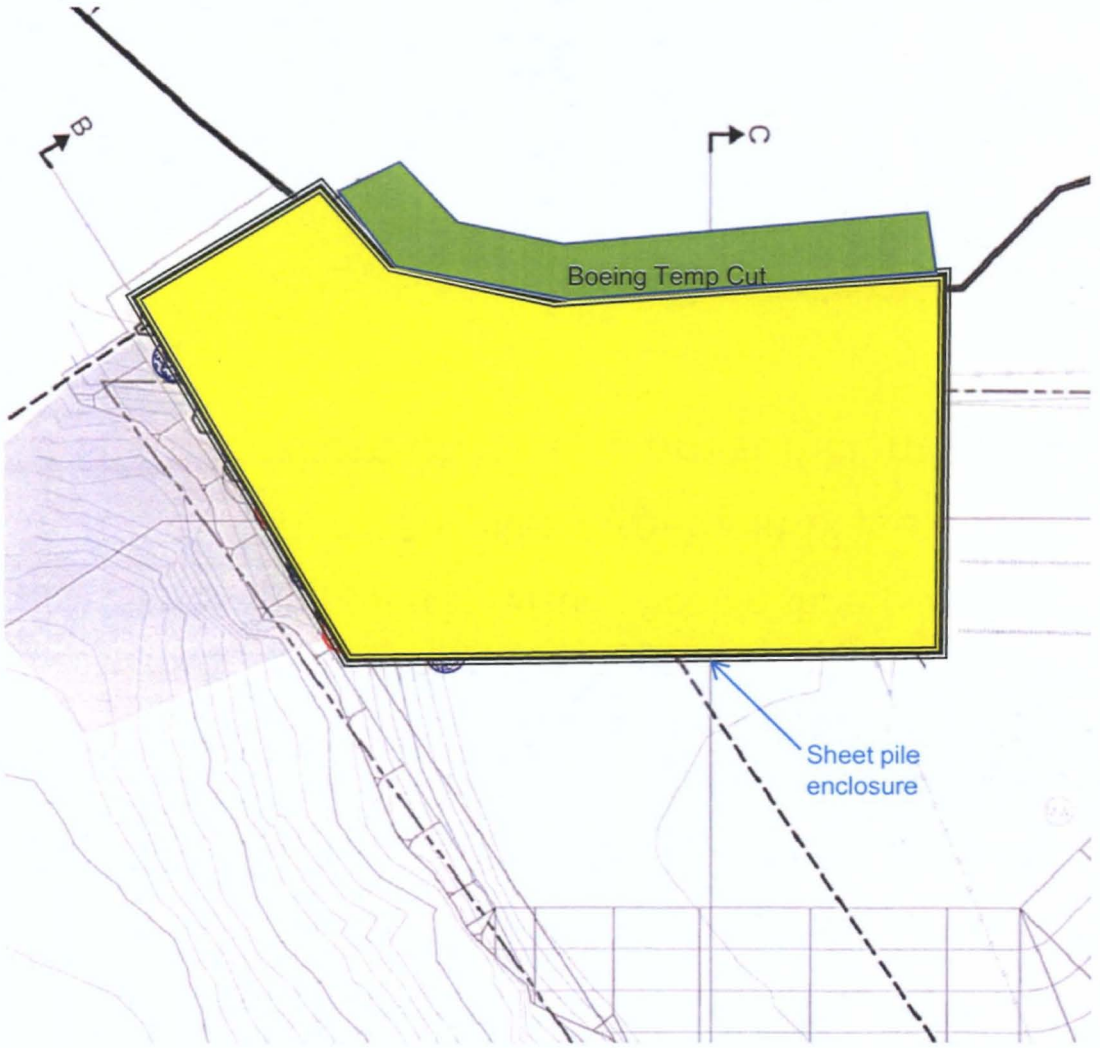
Pull Sheets

Expensive because of internal bracing and limited access for soil removal

Dewatering discharge must be treated

Complex construction likely to have increased risk of delays and cost over runs

Unbraced Sheet Pile Shoring & Excavation in the Wet - PREFERRED



Drive Sheets on perimeter up to face of Boeing 2-66 wall

Bench cut optional on JF property but temporary 6 to 7 foot cut required on Boeing property for safety of 2-66 wall

No internal bracing or dewatering

Water added to cofferdam to avoid need for bracing when excavating below El. 12

Excavate in wet to target elevations

Stage and stabilize excavation spoil for off site disposal

Confirmation sampling at base of excavation

Flocculation required for expedited settlement of suspended sediments

Backfill with Sand & Gravel

Treat water displaced by backfilling

Pull Sheets

All spoil removed below El. 12 likely TSCA

Limitations of construction will likely result in "fluff" layer at base of excavation with residual PCBs

Sheetpiled Excavation "In The Wet"

- Temporary sheetpile uplands cofferdam:
  - allows effective and more controlled excavation below water table
  - dampens or eliminates groundwater flow and tidal/river level fluctuations
  - fixes lateral excavation limits
  - uses and protects existing Boeing sheetpile
- Top of Bank sheetpiles already in place
- Sheets stacked on ground are sufficient to encompass CMP area

Questions for EPA to Guide Planning Process

- May we segregate and dispose of separately TSCA from non-TSCA soil (i.e., soil conservatively determined to be < 50 ppm), where it can be segregated?
  - Soils 0 – 7 ft bgs (i.e., soils above the level of the CMP source elevation)
  - Soils below the deepest documented levels > 50 ppm
- May we consider the soil at ~42 ft bgs (with 1 of 2 sample results > 1 ppm) as dragdown?
- What confirmation sampling will be required to document completion of the Third Modification?

Next Step and Schedule Questions

- What is EPA's schedule for Third Modification text and figure finalization?
- Level of detailed needed in Work Plan for EPA review and approval (as opposed to what JFC and Boeing need for contracting, etc.)?
- What contract-specific detailed documents will EPA need to review and approve (versus EPA just needing to know they exist)?
- What steps during plan implementation will EPA want to formally approve before JFC/Boeing can proceed with the next Plan step?
- What other topics need to be addressed now?